REMARKS

This response follows an Office Action of March 20, 2001 rejecting claims 1-7.

While the Examiner has withdrawn claims 8-23 from consideration as result of Applicant's election of species requirement, it is noted that Applicant's response of January 16, 2001 requested cancellation of claims 8-23. The Applicant reserves the right to file a Divisional Application on those claims directed to a non-elected specie.

Attached herewith is a marked-up sheet of Figure 5 correcting the number "25a" to "35a".

With respect to the objection to the specification, the Applicant has made those changes required to pages 4, 16 and 22.

Claims 1-7 stand rejected as unpatentable over Kohno in view of Applicant's statement of the admitted prior art in view of three additional references. The rejection is respectfully traversed. Minor changes have been made to claim 1, but those changes do not in anyway effect the scope of that claim.

Since the allowability of claims 1-7 can be predicated on the allowability on claim 1, Applicant's comments will be directed to that claim and the requirements set forth therein.

Applicant's claim 1 requires a radial tire having fundamental architecture requiring a belt having at least three rubberized cord plies. There is a requirement that the cords of the layers all cross with each other. The tread is defined in a rudimentary form as requiring one or more circumferential grooves in at least each side region of the tread portion. The Examiner should note the requirement of the circumferential grooves are in the side portion of the tread as

opposed to the crown portion. The purpose of defining those circumferential grooves is to provide a predicate for the width of cord layers.

Applicant's claim 1 then requires that with respect to the cords of the innermost cord layer and the middle cord layer, (1) each have an inclination angle of 10-25° with respect to the equatorial plane. Claim 1 then requires with respect to the cords of the outermost layer, (2) has an inclination angle of 45-115° with respect to the equatorial plane as measured in the same direction as the cords of the middle cord layer.

Applicant's claim 1 further requires with respect to the outermost cord layer that it has, (3) a width extending toward the end of the tread portion over an outermost groove edge of an outermost circumferential groove in the widthwise direction of the tread portion. This is illustrated in Figure 6. The circumferential grooves 40 are depicted in the tread portion and the outermost cord layer 37 has a width which extends over the outermost groove edge of an outermost circumferential groove. In that regard, the Examiner should note that Figure 6 also contains circumferential grooves 39 but the requirement of the claim is relative to the outermost circumferential groove namely the grooves 40.

The advantages of this construction are more than amply set forth in the examples beginning on page 54 with test data provided first and take Table on page 57. The examples of Applicant's invention are consistent with and fully commensurate with the scope of the claims. Thus, by comparative test data, to the extent that the Examiner contends that prima facie obviousness is raised such has been more than amply overcome by Applicant's delineation of substantial improvements in performance of the tire in accordance with this invention.

The Examiner is requested to reconsider the rejection set forth with respect to claims 1-7. The Examiner relies on the admitted stated prior art set forth on page 4, second paragraph, which is also illustrated in Figure 1. That structure when taken with Figure 2, shows a prior art radial tire having a belt 2 with 4 cord layers. The conventional tire utilizes a first cord layer 3 having cords arranged at a relatively large inclination angle and such is disposed as the innermost of the 4 cord layers. The remaining 3 layers, 4, 5 and 6 have cord angles which are small with respect to the equatorial plane.

The Examiner should also note that the width of the outermost cord layer 6 relative to the outermost circumferential groove 9. The deficiencies of this construction are set forth on page 4, last paragraph, with respect to Figure 2, which depicts a 3 cord layer structure comprising belt layers 11-13. That depiction of the prior art must be considered relative to the disclosure on Figure 3 which defines completely the problem of cord breakage because of the application of a bending force applied in the direction of the arrow 17 which causes a buckling phenomena in the cords to the outermost cord layer 13. The result is belt separation making it impossible to reuse the tire, generally by recapping. Thus, the scope and content of the prior art must take into consideration not only the disclosure on page 4, but also Figure 2 and the disclosure on page 3. Clearly, that prior art, while showing a 3 belt layer structure, does not in any way define in particular a belt having the three important criteria of claim 1 as set forth above.

The reference is more pertinent that Applicant's statement of the admitted prior art because it does define, as the Examiner points out, inclination angles of the cord layers. There is however, apparently no recognition or enabling disclosure concerning the width of the outermost

cord layer 8 with respect to the outermost circumferential groove in the tire pattern. The Examiner indicates correctly that the reference does not disclosure the width of the outermost cord layer in relation to the tread portion of the tire. The reference does illustrate in rudimentary form in Figure 1 the presence of circumferential grooves. There is however, no recognition or suggestion that the presence of those grooves is nothing more than representative and that the width of the outermost layer 8 has any relationship to those unnumbered grooves. At best then, it must be concluded that Kohno discloses a radial tire having a 3 cord layer belt construction with inclination angles as required by Applicant's claims and does also show a tread pattern which may have circumferential grooves.

At that point however, the level of disclosure must be considered nothing more than conjectural concerning the relationship of the width of the layer 8 to the tread pattern. That is because, as the Examiner correctly points out there is no affirmative disclosure concerning the relationship of the outermost cord layer to any portion of the tread portion of the tire.

In Applicant's system the importance of the width of the outermost cord layer 37 is explained beginning on page 17. With this structure, the outermost cord layer acts to control contraction of the cross cord layer 38 in the widthwise direction for reasons explained in the paragraph bridging pages 18 and 19.

Additionally, this attribute is tied to inclination angles of the cord layers themself as set forth on page 19. The corning property (CP) is then compared in Figure 7 to demonstrate the combined advantages of this invention.

There certainly is no recognition in Kohno or the admitted state of the prior art concerning this relationship of widths, as the Examiner has recognized in the rejection. The Examiner relies on Suzuki as showing a tire in which the outermost cord layer has the width equal to or larger then that of the tread. The Examiner contends that it would have been obvious to utilize that teaching to modify Kohno and this holding is respectfully traversed.

First, Suzuki relates to a motorcycle tire, a type which is distinctly different from that of the subject of this invention. This distinction is well documented because a motorcycle tire is subjected to camber thrust which is not a characteristic of a pneumatic tire for a four-wheel vehicle. More specifically, a motorcycle tire tilts relative to the ground as the motorcycle and its tire corners. The result then is a shifting of the axis of rotation of the tire relative to the ground and the application of camber thrust to the tire itself. It is for this reason, that the tread portion of the tire extends well beyond that of a conventional tire for a four-wheel vehicle . That is, camber thrust is applied as the ground contact region shifts the underlined belt structure is similarly reinforced. This characteristic is however, unique to motorcycle tires. It is an art recognized distinction in which it has been recognized that, unless there is some specific suggestion or interchange ability between those distinct tire types, one of working skill would not normally consult or rely on motorcycle tire technology as having application for use in tires for four-wheel vehicles.

This is all the more apparent when compared to the tires used in the present invention namely heavy vehicles such as trucks and buses.

Thus, in the first instance the artisan would reject Suzuki as not having applicability to that tire type and would not even consider its teachings as having any relevance.

Secondly, to the extent that Suzuki was considered at all it would have to be considered in its entirety, and not for the limited purpose as applied by the Examiner. It would not be considered only for the narrow showing of the relationship of the outermost belt ply to the circumferential grooves but also, for the cord angles of the belt itself. Stated differently, the artisan would not consider the geometry of the belt by looking only to its relationship to the tread portion but would also consider the construction of the belt layer themselves as fundamental to the definition of that layer of the tire.

Reference is made to column 4 in the Table in which the cord angles of Suzuki relative to the outermost belt layer are outside those defined by Applicant's invention. They are 18 and 28 degrees.

Cord angles of this angular orientation are already demonstrated to be inferior to those of the Applicant's invention. Reference is made to pages 20 and 21 of the disclosure here where that comparison is made relative to the cornering power of the tire as a whole. Note in particular, the first full paragraph beginning on page 21. The result then is a buckling and cut failure which cannot be suppressed when those cord angles are employed. Thus, there is no expectation of satisfactory results because the artisan would not simply extend the cord widthwise lengths without also considering that in doing so the cord angles would be orientated in a manner consistent with Suzuki. Thus, for this second reason, it is believed that the reference would be rejected when considered in its entirety.

In summary then, the Applicant respectfully contends that when the prior art is carefully considered, there is no suggestion or motivation to redefine the belt layers of Kohno where the cord angles would be maintained but the width of the outermost layer would be extended relative to the outermost circumferential groove in the tread layer.

As such, the Applicant respectfully contends that there is no prima facie obviousness in this case. As noted however, to the extent that the Examiner does believe that the prior art would be combined in some logical manner, Applicant's test data more than confirms the unexpected results which are obtained in the context of a truck and bus tire of this invention. Thus, reexamination and reconsideration is respectfully requested. Should the Examiner have any questions he is requested to contact that undersigned attorney of record at the local exchanged listed below.

Applicant hereby petitions for any extension of time which may be required to maintain the pendency of this case, and any required fee, except for the Issue Fee, for such extension is to be charged to Deposit Account No. 19-4880.

Respectfully submitted,

Neil B. Siegel. # 21,092
for Neil B. Siegel
Registration No. 25,200

SUGHRUE, MION, ZINN,
MACPEAK & SEAS, PLLC
2100 Pennsylvania Avenue, N.W.
Washington, D.C. 20037-3213
Telephone: (202) 293-7060
Facsimile: (202) 293-7860

Date: August 16, 2001

APPENDIX
VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE SPECIFICATION:

Please replace paragraph 2 on page 4 with the following new paragraph:

Moreover, in the conventional tire shown in Figure 1, the first cord layer 3 containing cords arranged at a relatively large inclination angle is an innermost cord layer, while the inclination angle of the cord in the second to fourth cord layers 4, 5, 6 with respect to the equatorial plane E is small, so that when a top of a rib formed in a mold for the formation of a circumferential groove 9 bites into an uncured tread rubber of a tread portion in an uncured tire during the vulcanization building of the uncured tire, since the bending rigidity of a laminate of uncured cord layers is small, the bending resistance of the laminate to the entrance of the rib top of the mold is insufficient and hence the portion of the belt [20] 2 just beneath the circumferential groove 9 indicates concave form in the resulting product tire as shown in Fig. 1. Such a concave form in the cord layers 5, 6 has a problem that the recapping operation is considerably degraded because the rib top is hardly peeled off from the concave form.

Please replace paragraph 2 on page 16 bridging page 17 with the following new paragraph:

In the tread pattern of this tire 30 shown in Fig. [2] 2, the central region of the tread portion 31 is provided with rows of blocks 44, 45, 46 defined by four circumferential grooves 39, 40 extending straightforward in the circumferential direction and a plurality of lateral grooves 41, 42, 43 extending between the mutual circumferential grooves 39, 39 and between the circumferential grooves 39 and 40 and opening to the respective circumferential grooves, which

grooves being formed on the tread rubber 32, and each of both side regions of the tread portion is provided with a row of blocks 48 defined by the circumferential groove 40 and a plurality of lateral grooves 47 opening thereto.

Please replace paragraph 2 on page 22 with the following new paragraph:

In the end zone of the middle cord layer [37] 36 shown in Figs. 5 and 6, only the cross cord layer 38 is subjected to shearing deformation and hence shearing strain concentrates between the end portion of the middle cord layer 36 and the innermost cord layer 35 just beneath the tread portion 31 of the tire 30 under loading and the separation failure is apt to be caused in the cross cord layer 38 at the end zone of the middle cord layer 36.

IN THE CLAIMS:

Please enter the following amended claims:

Claim 1. (Amended) A pneumatic radial tire comprising; a radial carcass [comprised of] having at least one rubberized cord ply extending between a pair of bead cores embedded in a pair of bead portion and reinforcing a pair of sidewall portions and a tread portion, a belt reinforcing the tread portion at an outside of the carcass and comprised of three rubberized cord layers, an innermost cord layer and a middle cord layer among these cord layers being a cross cord layer that cords of the layers are crossed with each other with respect to an equatorial plane of the tire, and one or more circumferential grooves provided in at least each side region of the tread portion, [characterized in that] the cords of each of the innermost cord layer and the middle cord layer have an inclination angle of 10-25° with respect to the equatorial plane, and cords of

an outermost cord layer have an inclination angle of 45-115° with respect to the equatorial plane as measured in the same direction as in the cords of the middle cord layer, and the outermost cord layer has a width extending toward an end of the tread portion over an outermost groove edge of an outermost circumferential groove in a widthwise direction of the tread portion.